No. 672,123. Patented Apr. 16, 1901.

A. G. DELANOY.

APPARATUS FOR RECORDING SPEED OF SHIPS.

(Application filed Mar. 8, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

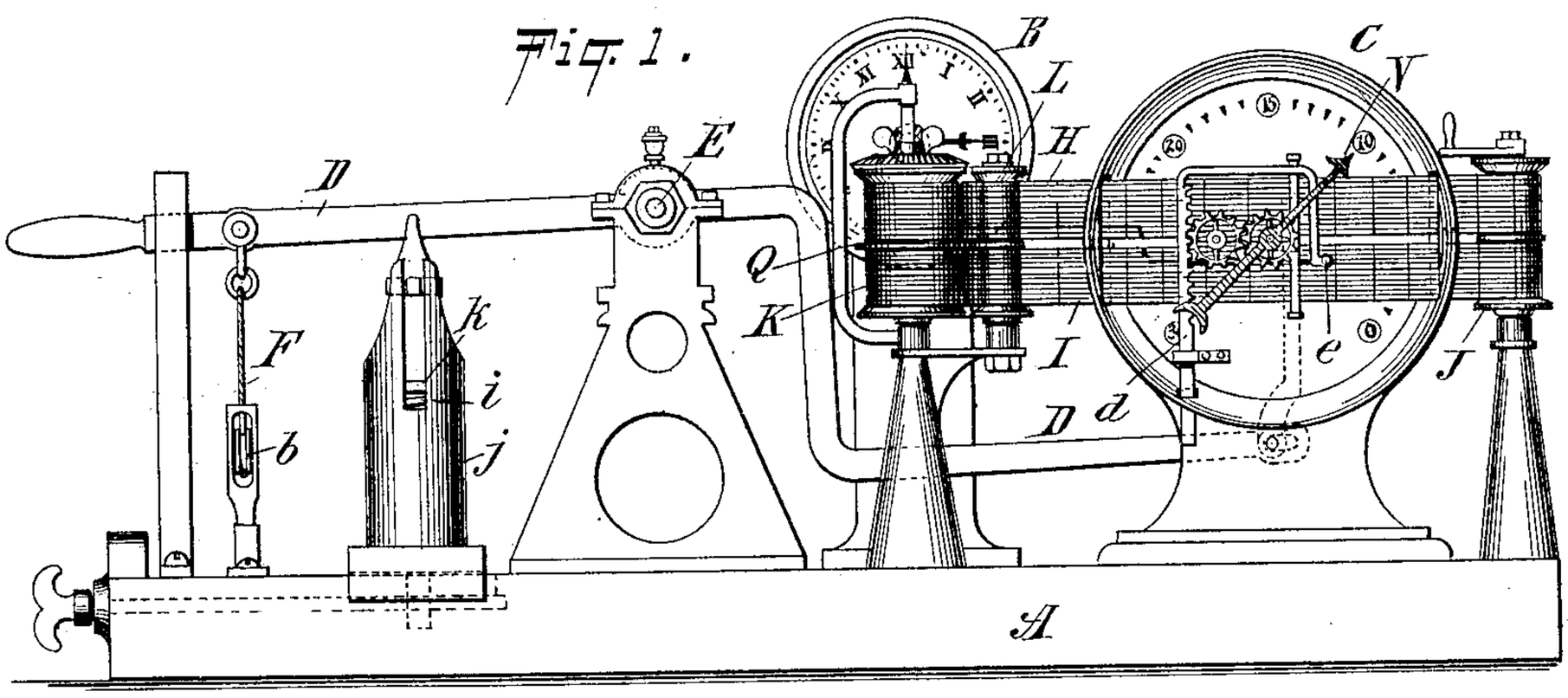
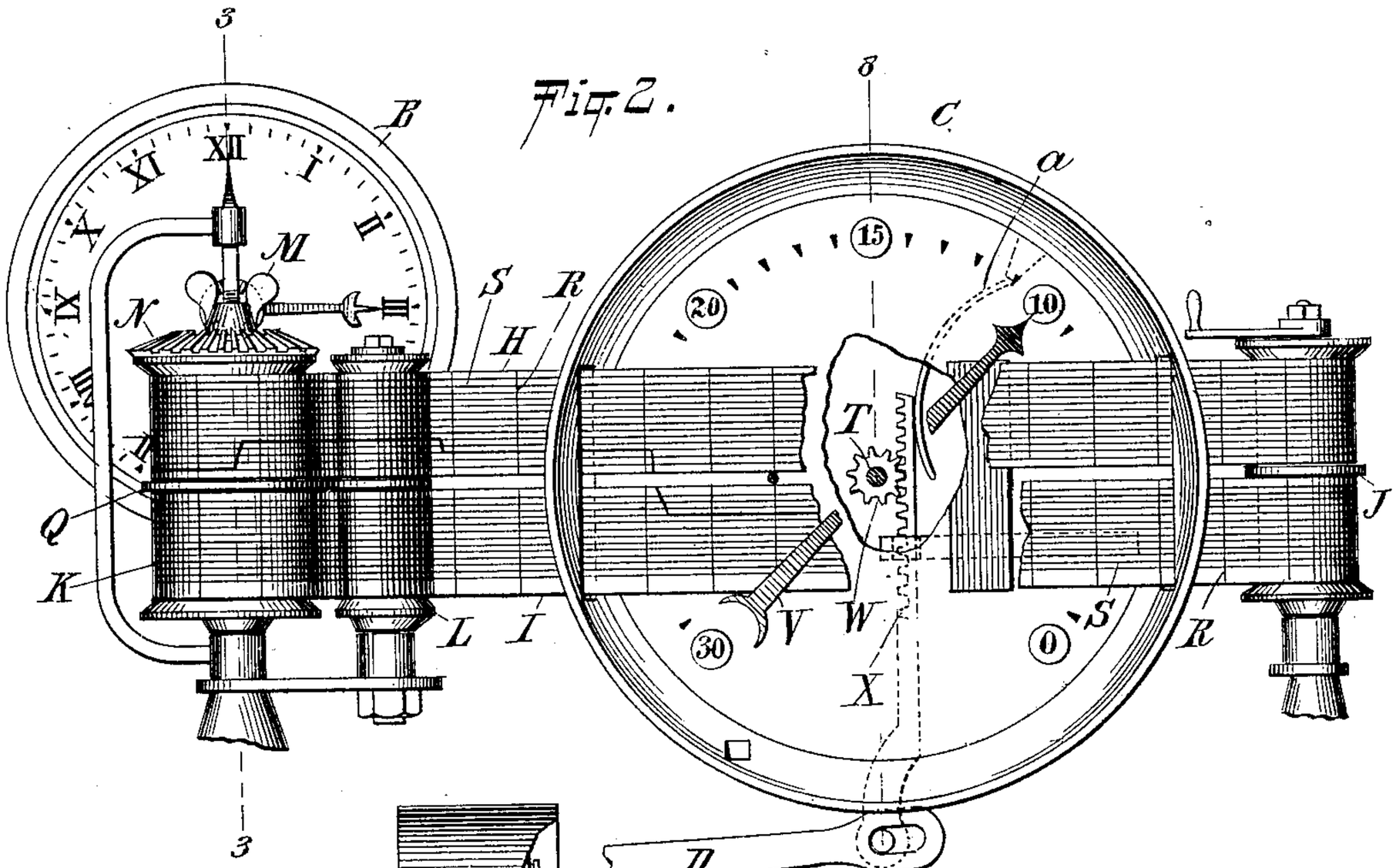


Fig. 2.



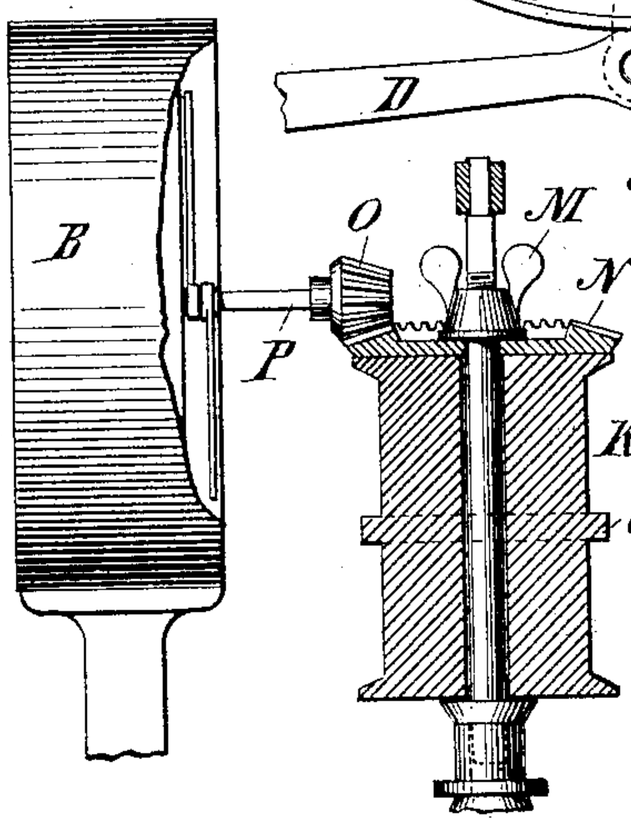


Fig. 3.

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BY

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No. 672,123. Patented Apr. 16, 1901.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 4.

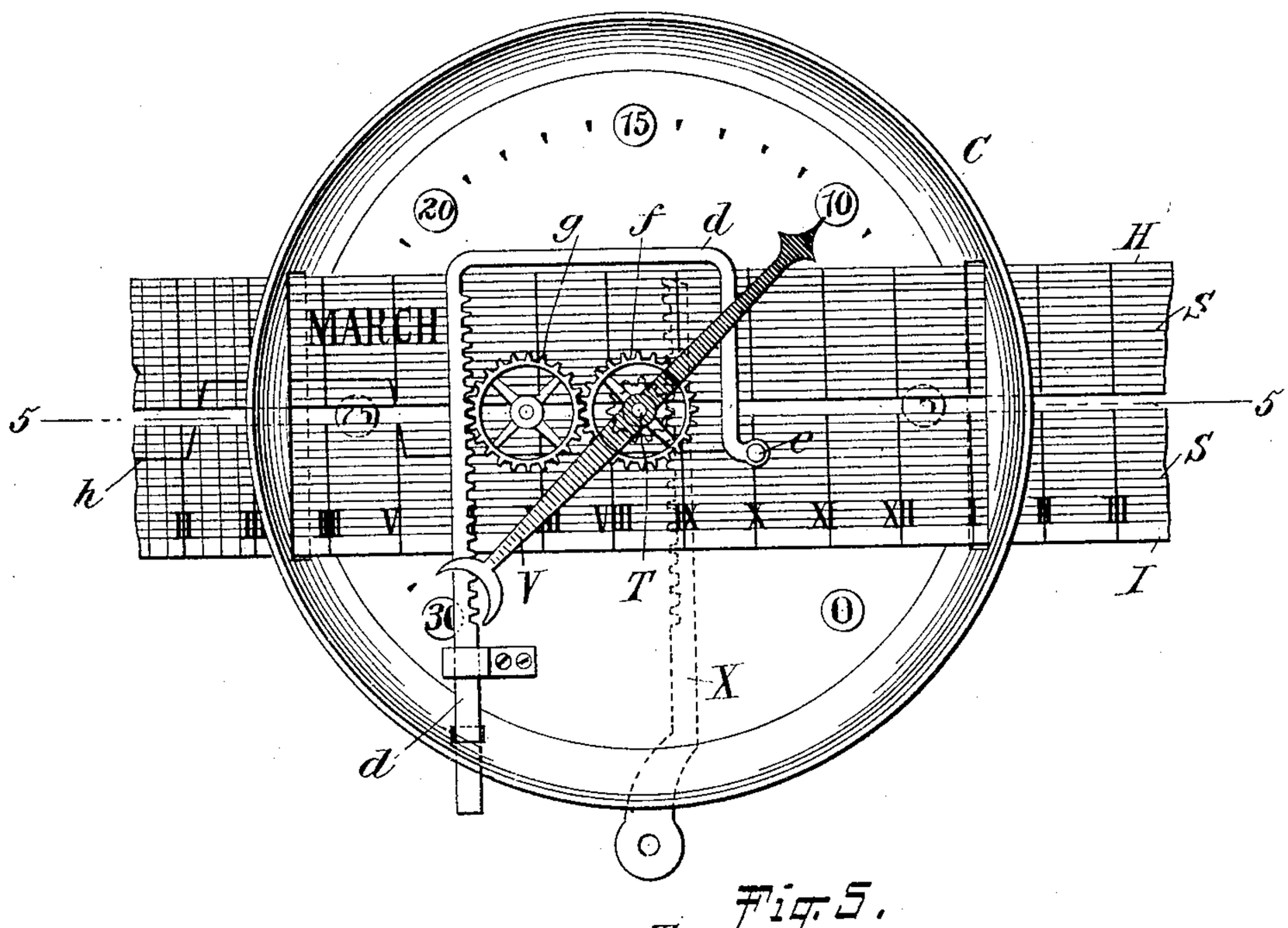


Fig. 5.

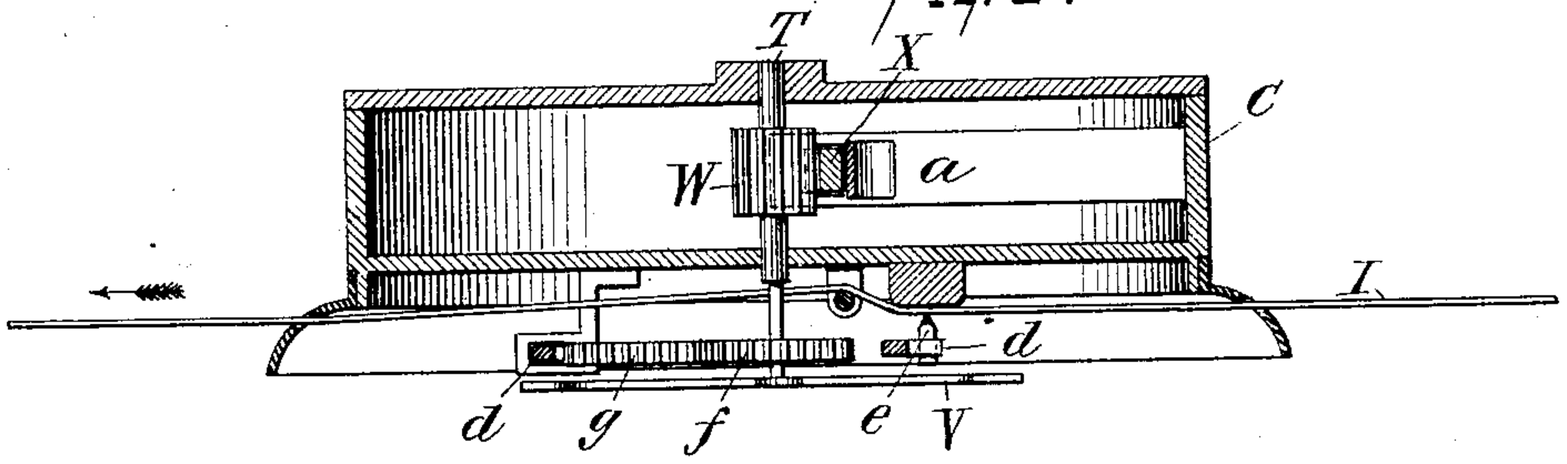
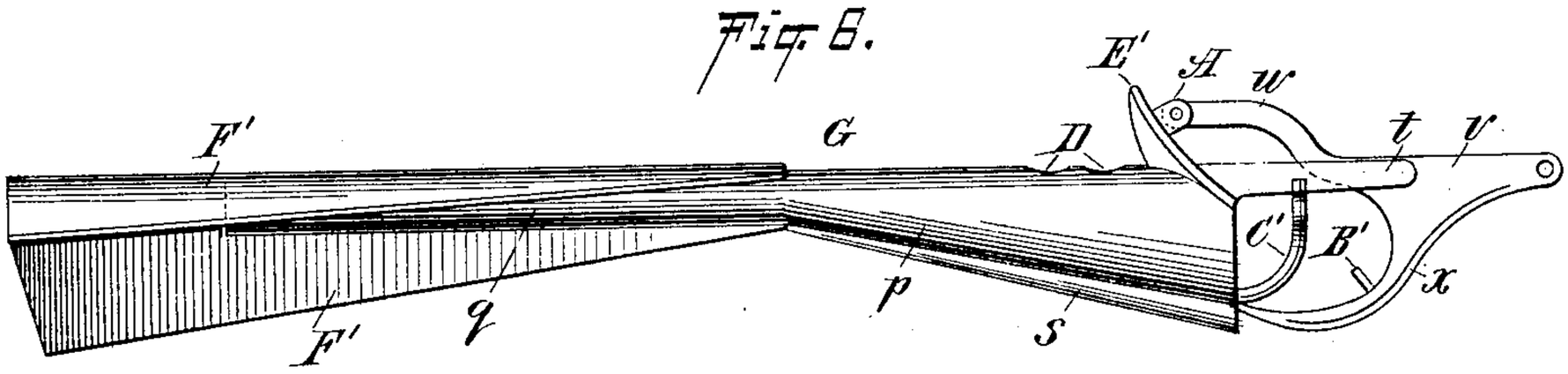


Fig. 6.



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APPARATUS FOR RECORDING SPEED OF SHIPS.

(Application filed Mar. 8, 1899.)

(No Model.) 3 Sheets—Sheet 3.

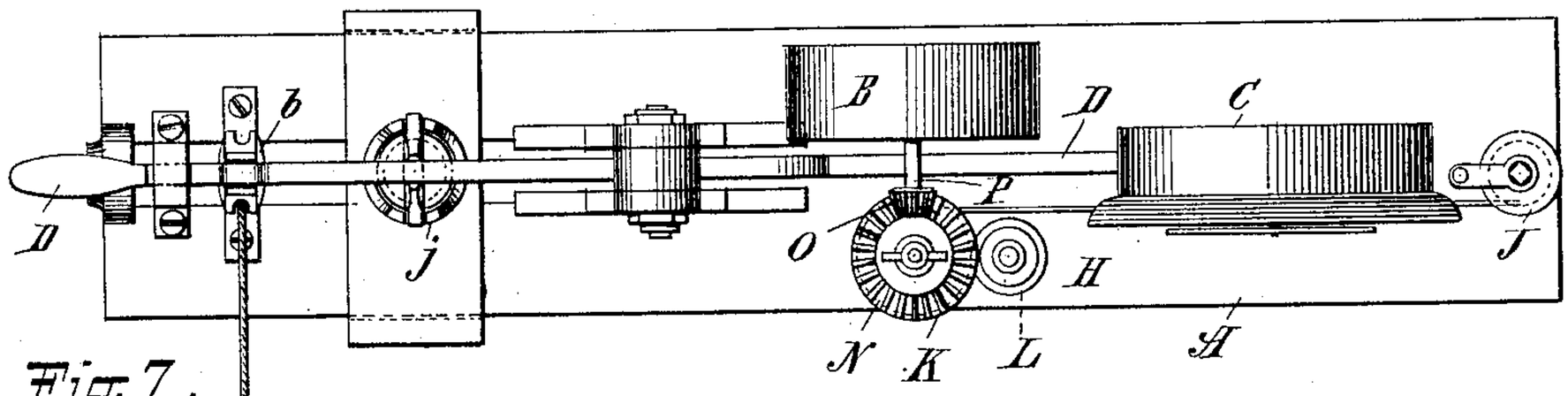


Fig. 7.

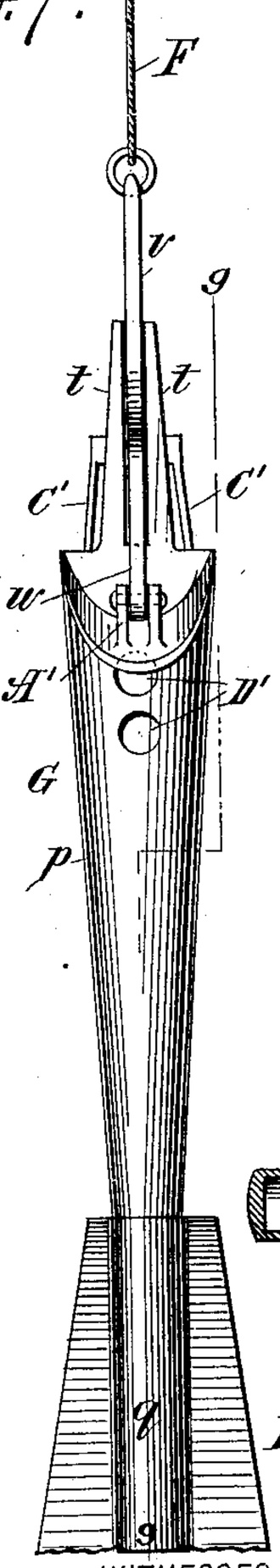


Fig. 8.

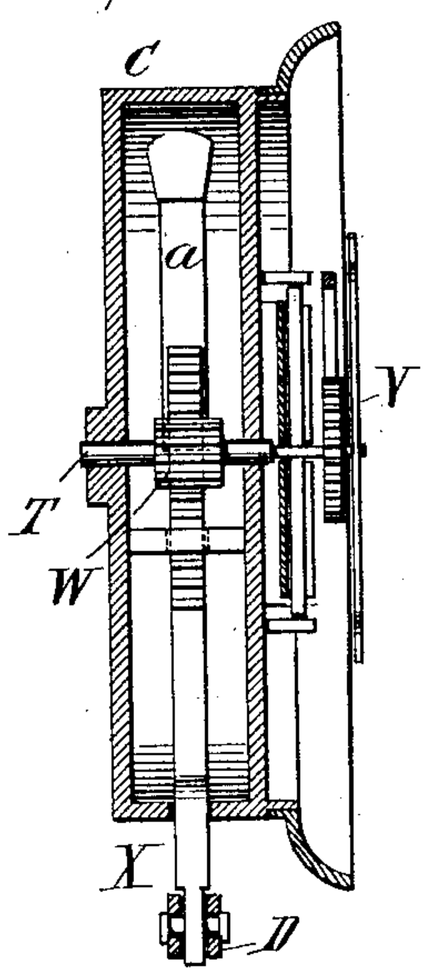


Fig. 10.

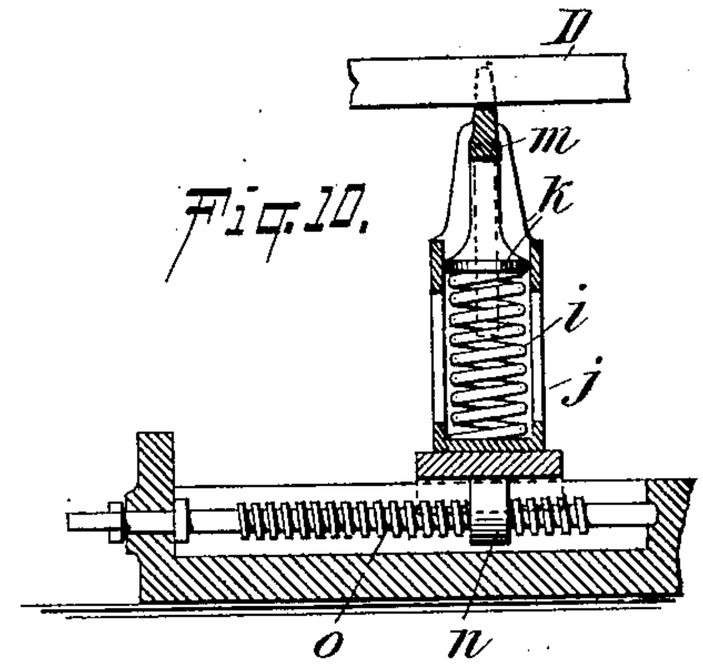


Fig. 9.

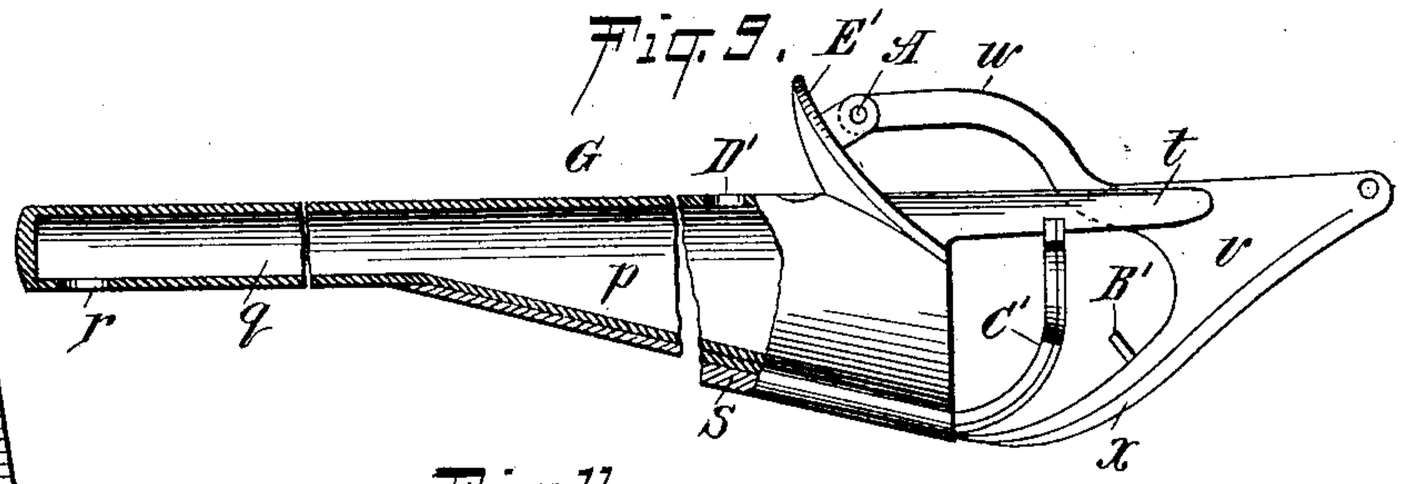
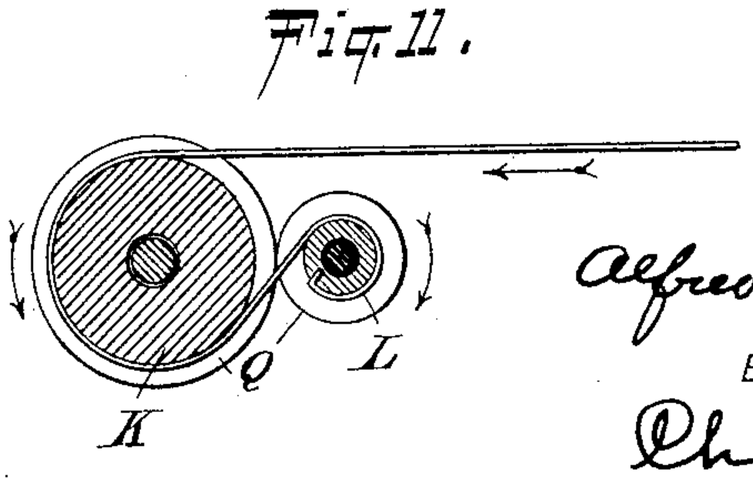


Fig. 11.



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UNITED STATES PATENT OFFICE.

ALFRED G. DELANOY, OF NEW YORK, N. Y.

APPARATUS FOR RECORDING SPEED OF SHIPS.

SPECIFICATION forming part of Letters Patent No. 672,123, dated April 16, 1901.

Application filed March 8, 1899. Serial No. 708,238. (No model.)

To all whom it may concern:

Be it known that I, ALFRED G. DELANOY, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Apparatus for Recording the Speed of Ships and other Vessels, of which the following is a specification.

The invention relates to improvements in apparatus for registering or recording the speed of a ship or other vessel; and it consists in the novel features, combinations, and arrangement of parts hereinafter described and more particularly pointed out in the claims.

I have embodied my invention in its presentation in this application in an apparatus comprising a timepiece or clock, an indicating-dial, a recording strip or tape actuated by the timepiece and moving along said dial, means connected with the shaft of the dial for marking the varying speeds of the ship or other vessel upon said strip or tape, and a drag to be drawn through the water astern of the ship and connected with the shaft of the dial. The said drag or log is of such peculiar construction that the resistance of the same varies directly as the speed. The connection and arrangement of the parts are such that the resistance of the drag will actuate the shaft of the dial, so that the latter will indicate the speed of the vessel and the pencil connected with its shaft will mark upon the moving strip or tape actuated by the clock or timepiece mechanism. The dial will temporarily indicate the varying speed of the ship; but in addition to this my invention provides that the speed of the ship shall be constantly recorded upon the strip or tape in order that at the end of a voyage or other length of time the officers of the steamship company or other persons may by examining the strip or tape be enabled to learn just what speed the ship was making at all times during the voyage. The strip or tape is actuated by the clock mechanism and moves a definite distance with the passing of each hour and fraction thereof of the clock, and the strip thus moving in harmony with the timepiece has, as above explained, the speed of the vessel recorded upon it.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of an apparatus constructed in accordance with and embodying the invention, the drag being omitted. Fig. 2 is an enlarged front elevation, partly broken away, of a portion of same and illustrates more particularly the timepiece, dial, and recording-tape. Fig. 3 is a vertical section through a portion of same on the dotted line 3 3 of Fig. 2. Fig. 4 is an enlarged front elevation of the dial and the means actuated by the shaft thereof for marking upon the recording strip or tape. Fig. 5 is a longitudinal horizontal section of same on the dotted line 5 5 of Fig. 4. Fig. 6 is a side elevation of the drag which in use is connected to actuate the shaft of the dial. Fig. 7 is a top view of the apparatus constituting the invention, the drag being shown connected with the dial mechanism. Fig. 8 is a vertical transverse section through the dial-casing on the dotted line 8 8 of Fig. 2. Fig. 9 is a side elevation, partly broken away and partly in section, of the drag, the section being on the dotted line 9 9 of Fig. 7. Fig. 10 is a central vertical longitudinal section through a portion of the base of the apparatus and the resistance-spring for the lever intermediate the cable of the drag and the dial. This figure is intended to illustrate more particularly the means for adjusting this spring and its casing longitudinally of the base. Fig. 11 is a horizontal section through the spools carrying the recording-tape and located adjacent to the clock or timepiece. This figure is presented to illustrate the direction of travel of the recording-tape.

In the drawings, A designates any suitable base upon which the mechanism apart from the drag may be supported.

B indicates the clock or timepiece, C the dial, and D a lever pivoted at E and connected at its inner end with means for driving the shaft of the dial C, while at its other end said lever D is connected by a suitable cord or cable F with the drag G. In the present instance the recording strip or tape is in two corresponding pieces H I, the same being in two pieces instead of in one in order that said pieces may travel one on each side

of the shaft of the dial C. The strips or tapes H I may be of paper and divided by vertical lines into hours and by horizontal lines into miles, as hereinafter more fully explained. The strips or tapes H I unwind from the spool J, and thence travel across the face of the dial C to and around the spool K and to and upon the spool L, the latter being the final receiving-spool for the strips or tapes H I. The tapes or strips H I receive their motion from the clock mechanism, which otherwise than as to its connection with the spool K is of usual construction. Upon the top of the spool K is clamped, by means of a thumb-screw M, a bevel gear-wheel N, which is engaged by a pinion-wheel O, whose shaft P is connected with or forms an extension of the clock-shaft carrying the usual hands. The movement of the clock-shaft carrying the clock-hands is by means of said pinion-wheel O communicated to the bevel gear-wheel N and spool K and from said spool K to the spool L, whereby said spool L is caused to draw the strips or tapes H I along in conformity with the movement of the clock and to wind said strips or tapes H I upon itself. Any suitable means may be employed for imparting the motion of the spool K to the spool L; but in the present instance I provide at the center of said spools the annular flanges or shoulders Q, which, as indicated in Figs. 2 and 11, firmly contact with one another, and thereby, owing to this contact, the spool K is enabled to communicate its revoluble motion to the spool L. The strips or tapes H I are not wound upon the spool K, but simply travel over the surfaces of said spool and are wound upon the spool L. It would not be convenient to at all times have the pinion-wheel O connected with the clock mechanism in constant engagement with the gear-wheel N and spool K, since that might interfere with the setting of the clock or other manipulation, and hence the gear-wheel N may be loosened from the spool K by relieving the thumb-nut M, so that the gear-wheel N, even though it should remain in mesh with the pinion-wheel O, will not act upon the spool K nor interfere with the setting of the clock-hands. The dial of the clock, as well as the hands of the clock, will be of usual form and construction, and the clock-shaft is utilized to effect the traveling motion of the strips or tapes H I, the latter traveling a definite predetermined distance with each hour traveled by the clock-hands, and thus the strips H I are marked with the vertical lines R to indicate hours and with the horizontal lines S to indicate miles. The spaces between the vertical lines R represent hours, and additional vertical lines may, if desired, be employed intermediate the lines R to indicate half-hours and quarter-hours or any other subdivision of hours that may be desired. The vertical lines R should be marked to conform to the hour-marks on the clock B, and in addition should be marked "A. M." and "P. M.," respectively. The strips or tapes H I should also be marked with the day of the month and year, so as to constitute a permanent record, showing just what speed the vessel made at all times during any special voyage or period. The horizontal lines S will substantially equal in number the numerals on the indicator-dial C. Thus since the indicator C is numbered up to "30" there should be upon the strips H I substantially thirty horizontal lines S, the lower strip or tape I representing, as nearly as may be, fifteen miles and the upper strip or tape H representing fifteen miles. In view, however, that the strips or tapes H I are separated to afford space for the shaft of the dial C, and that this space must be considered in the operation of recording the speed of the vessel, the lower strip I has but fourteen lines S, the fifteenth line being represented by the middle of the space between the two strips H I.

The indicator C is in the form of a dial having a central shaft T, carrying the hand V, and also a pinion-wheel W, which is engaged by the toothed rack X, (shown in Figs. 2 and 8,) said rack X being held in proper relation to the pinion-wheel W by means of the spring *a*, flexed against said rack. The shaft T and pinion-wheel W remain stationary, except when they are rotated by the action of the rack X, and the rack X receives its motion from the drag G while the latter is being pulled through the water. The lower end of the rack X is freely secured to the end of the lever D, which, as above explained, is mounted in suitable supports or bearings at E and is connected by the cord or cable F with the drag G. The cord or cable F is secured at one end to the lever D, as shown in Fig. 1, and thence passes over a pulley *b* to the drag G. The drag G will be hereinafter described in detail, and at present it will be sufficient to understand that by the resistance offered to the movement of the drag through the water a pull is created through the cord or cable F upon the outer end of the lever D, and that this pull operates to depress the outer end of the lever D and to move the inner end of said lever with the rack X upward, thereby turning the pinion-wheel W, shaft T, and indicator-hand V. The greater the speed of the vessel the greater will be the resistance offered to the drag G, and thus with the increased speed of the vessel the greater will be the movement of the rack X and indicator-hand V. The indicator-hand V will indicate upon the dial C the speed at which the vessel is moving; but since this speed will vary from time to time it is desirable that a permanent record of the speed may be made upon the strips or tapes H I, and thus from the shaft T of the indicator-dial C, I provide means (more clearly illustrated in Figs. 1, 4, 5, and 8) for marking upon said strips H I during their traveling movement toward the clock or timepiece B, said means comprising the vertically-movable rack *d*, carrying a pencil *e*

and operated from the shaft T by means of the gear-wheel *f*, mounted upon said shaft, and the gear-wheel *g*, which is engaged by the gear-wheel *f* and itself engages the rack *d*. The movement of the rack X, connected with the drag, is imparted to the shaft T, and the movement of this shaft is by the gear-wheels *f g* communicated to the rack *d*, which during its vertical reciprocation carries the pencil *e* against the strips or tapes H I, marking the latter as a chart, as denoted by the line *h* in Fig. 4. The vertical reciprocation of the rack *d*, carrying the pencil *e*, is in concurrence with the movement of the shaft T and hand V, and hence when, for instance, the ship is moving at the rate of ten miles an hour the indicator-hand B will be pointed at "10" on the dial C, and the pencil *e* will be making a straight mark on the tenth line S of the strip or tape I. As the speed of the ship varies the hand V will move along its path, and with each variation of the hand V the rack *d* will move the pencil *e* upward or downward to correspond. Should the speed of the vessel lessen from ten miles an hour, the rack *d* will move downward and the pencil will mark upon the strip or tape I, and should the speed of the vessel increase to, say, nineteen miles an hour the pencil *e* will move upward and mark upon the upper strip or tape H, as denoted at the left-hand side of Fig. 4. Thus the pencil *e* will by drawing a line upon the strips or tapes H I record the speed the vessel is making, and at the end of each voyage or at the end of any other length of time the strips or tapes H I may be read and will give a history of the speed of the vessel during its voyage. The pencil *e* has a direct vertical motion, and thus upon any sudden slowing down or increase in speed of the vessel the pencil is enabled to make a quick descent or ascent to reach the line on the strips or tapes H I, denoting in miles such decrease or increase, and the time at which such decrease or increase took place may likewise be read on the strips or tapes. The strips or tapes H I thus comprise a time-sheet as a part of the record of speed of the vessel, and their travel is automatic and the recording thereon by means of the pencil *e* is also automatic. The pencil *e* should mark a line differing in color from the line printed upon the strips or tapes H I, in order that the same may be easily read and distinguished from the lines S upon said strips or tapes. The strips or tapes H I are moved solely by the clock mechanism, and the indicator-hand V and pencil *e* are moved solely by a pull exerted on the rack X by means of the drag G. In order to create a resistance to the force of the drag G, I provide below the outer end of the lever D the spring *i*, which, as illustrated in Fig. 10, is within a cylindrical casing *j* and has at its upper end a plunger *k*, whose rod *m* is bifurcated to afford rest for the lever edges of the lever D. When the drag G, through its cord or cable F, is pulling downward upon the outer end of the lever D, the latter is forced to compress the spring *i* before it can operate to move the rack X upward for the purpose of revolving the shaft of the indicator-dial C. The spring *i* should be of predetermined strength in accordance with the size of the apparatus and other conditions, and in order that the resistance to be offered by the spring may be regulated at will to meet all conditions I mount the lower end of the cylinder *j*, carrying the spring *i* upon the base A and connect said cylinder *j* by means of an internally-threaded nut *n* with an adjusting-screw *o*. The turning of the screw *o* will naturally result in the cylinder *j* being moved toward or from the timepiece B, and thus the point along the lever D at which the spring *i* will direct its resistance may be regulated at will. The lever D has simply a rocking motion at the bearing-point E to move the rack X, hand V, and pencil-rack *d*, and said lever is normally held by the resistance of the spring *i*, but is capable of yielding to the force created by the drag G. The spring *i* operates constantly to move the lever D toward its normal position and the hand V toward its "0" position with each lessening of the force of the drag G due to the slowing up of the vessel. The greater the speed of the vessel the greater will be the force exerted by the drag G, and hence the more compressed will become the spring *i* and the greater will be the upward movement of the pencil-rack *d*, the hand V correspondingly turning to indicate upon the dial C the increased speed.

The drag G is, as above explained, connected with the lever D by means of a cord or cable F and in use will be drawn along through the water astern of the vessel. The drag G is more fully illustrated in Figs. 6, 7, and 9, and consists of a hollow funnel-shaped tube *p*, tapering toward its outer end, terminating at the said end in a reduced cylindrical portion *q*, which is closed at its outer end and contains an opening *r* at its lower side. The funnel-shaped portion of the drag G will preferably be weighted by an extra thickness of metal *s* at its lower side. At the upper front portion of the drag G are the forwardly-extending arms *t t*, between which a pivoted member *v* is adapted to play, this member *v* being at its front end directly connected with the cord or cable F and having the rearwardly-extending upper arm *w* and rearwardly-extending lower arm *x*. The rearwardly-extending upper arm *w* is pivoted between lugs A′, so that the member *v* may be enabled to have a hinge-like movement when necessary. The lower rearwardly-extending arm *x* passes downward in front of the funnel-shaped portion *p* of the drag, and its edge will be sharpened, so that it may cut through grass or like obstructions with which the drag may come into contact during its travel through the water. The lower rearwardly-extending arm *x* is provided with a pin B′,

which by coming into contact with the arms *t* will limit the upward motion of the pivoted member *v*. Extending in front of the drag and at opposite sides of the path of the pivoted member *v* are the rigid bars C′, which likewise should have sharpened front edges. The bars C′ prevent the entrance of grass and like substances into the drag G and by being sharpened at their front edges may cut through such grass as they may meet while in transit through the water. The sharpening of the edges of the pivoted member *v* and arms C′ also tend to permit of the free entrance of the water to within the drag G. The upper front portion of the drag contains one or more apertures D′ and is provided with the upwardly-extending deflector E′, which carries the lugs A′, to which the member *v* is pivoted, and also furnishes a surface to contact with the water and aid in keeping the drag below the surface of the water. The rear portion of the drag G will be provided with blades F′, of suitable form and extent, to aid in guiding the drag G and in keeping it as nearly as possible in a horizontal position. The drag is a hollow device open at its front end and having a restricted discharge at its rear end, this discharge being preferably through an aperture *r*, located at the lower side of the drag, said aperture being thus placed in order that the discharge of the water may operate to keep the rear end of the drag from descending below the front end of the same. It is better to keep the drag as nearly as possible in a horizontal position and at a uniform depth below the surface of the water. The hinging of the member *v* at the front end of the drag will allow the drag to remain substantially in a horizontal position, since the member *v* will yield to the inclination of the cord or cable F. The apertures D′ at the upper front portion of the drag are to aid in affording a proper exit for the water from the drag and to facilitate the maintaining of the drag in its horizontal position.

When in practical operation the drag G will, as above explained, be drawn along through the water astern of the vessel, and the resistance of the water to the movement of the drag G will cause the latter to pull on the cord or cable F and, as above described, effect the movement of the lever D and rack X, the effect of the movement of the rack X being to rotate the shaft T and indicator-hand V and also, through the intermediate gear-wheels *f g*, to actuate the pencil-rack *d*. When the apparatus is at rest, the spring *i* will maintain the lever D in a normal position, the pencil *e* at this time being below the first line S of the lower strip or tape I and the indicator-hand V being at "0" of the dial C. During the movement of the vessel, however, the resistance to the motion of the drag G would at once have its effect upon the lever D and the parts connected therewith. Thus upon the starting of the vessel the clock or timepiece B would be set and started and the drag G would be cast overboard astern of the vessel. While the vessel is moving at a slow speed the resistance to the drag G will be comparatively light, and consequently the pull exerted by the drag upon the lever D will be correspondingly light, and the hand V and pencil-rack *d* will have a limited movement, the pencil moving upward and marking on the strip I along the line which will indicate the speed of travel of the vessel. With any increased speed of the vessel the resistance to the drag G will be increased, and consequently the pull on the lever D will be greater, and the result of this will be that the hand V will move farther around the dial and the pencil *e* will ascend and mark at a higher elevation along the strip I, or the strip H, if the speed should be sufficiently increased. While the vessel is traveling at fourteen miles an hour the pencil *e* will move along the top line of the lower strip or tape I. When the vessel is traveling at fifteen miles an hour the pencil *e* will be within the space between the strips or tapes H I, and there being then no mark upon the lower edge of the strip H it will be understood from this fact that the vessel was traveling at fifteen miles an hour. At any increase of speed of the vessel up to, say, thirty miles an hour the pencil *e* will do its marking upon the upper strip or tape H. Upon the slowing down of the speed of the vessel the pencil *e* will correspondingly descend and mark at the proper place upon the strip H or strip I in accordance with the degree of speed the vessel was at the time under. As above described, I employ the two strips H I or, in other words, make the recording-strip in two pieces H I in order that the same may without obstruction pass by the shaft T of the dial-indicator C. By making the recording strip or tape in two pieces I am enabled to keep this tape directly in line with the center of the dial C and to prevent the same from obstructing the numerals on the dial, and I am thereby also enabled to have a spacious recording strip or tape, so that it may be easily read. One strip or tape in an individual piece may, however, be used by altering the gearing, and this individual strip or piece might be the one lettered H or the one lettered I; but under such circumstances the lines S would have to be very close together or the strip have to be so wide as to unduly cover the numerals on the dial C above or below the shaft T, according to the location of said strip. I thus for greater convenience form the recording strip or tape into two individual pieces and move the same together from the spool J to the spool L; but I do not confine the invention to the use of the two individual strips H I as constituting the recording-sheet. As above explained, the mechanism of the timepiece B will cause the traveling motion of the recording strip or tape whether the latter be in one piece or two pieces, and during the traveling motion of the recording strip or tape the speed of the ves-

sel will be indicated thereon by means of the pencil *e*, the latter being actuated by the resistance offered to the drag G due to the speed of the vessel. The indicator-hand V will to the passer-by also indicate the speed of the vessel; but the record made on the strips or tapes H I is intended for future use and as a means whereby the owner of the vessel may be informed of the speed the vessel has been making from hour to hour and day to day during the voyage.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The indicating-dial having numerals, the indicating-hand adapted to travel over the same along the line of said numerals, the gear-wheel on the shaft of said hand, and the toothed rack-bar in mesh with said gear-wheel for operating said hand, combined with the lever adapted to have an oscillatory motion and connected with said rack-bar and normally holding said rack-bar at its "0" position and by spring action yieldingly resisting the motion of said hand from said position, and the drag to be drawn through the water astern of the vessel and operatively connected with said lever so that the resistance offered to the drag may be utilized in actuating said rack-bar, lever and hand from their normal position, said oscillatory lever thus being actuated to move in one direction by said drag and in the other direction by spring action; substantially as set forth.

2. The hollow drag of elongated form having the open funnel-shaped front portion and the reduced rear portion, combined with the marking or recording mechanism, the strip on which the marking or recording is performed, and means intermediate said mechanism and said drag whereby the resistance to the latter is utilized to actuate said mechanism; substantially as set forth.

3. The hollow drag of elongated form having the open funnel-shaped front portion and the reduced rear portion, combined with the indicating-dial, the hand therefor, a spring yieldingly holding said hand at its "0" position, and means intermediate said hand and said drag whereby the resistance to the latter is utilized to actuate said hand from said position; substantially as set forth.

4. The hollow elongated drag having the open funnel-shaped front portion and the reduced rear portion and provided with the guiding-blades and also with the weight at the lower side of its said funnel-shaped front portion, combined with the indicating-dial, the hand therefor, a spring yieldingly holding said hand at its "0" position, and means intermediate said hand and said drag whereby the resistance to the latter is utilized to actuate said hand from said position; substantially as set forth.

5. In an apparatus of the character described, the time mechanism, the spool K actuated thereby, the spool J, the spool L, and the recording-strip passing from said spool J around said spool K and upon said spool L, combined with the indicator having its hand and across the face of which indicator the said strip is adapted to travel under the action of said time mechanism, the pencil for marking upon said strip, means connected with the shaft of said hand for imparting motion to said pencil, the drag to be drawn through the water astern of the vessel, and means intermediate said drag and said shaft, whereby the resistance offered to the drag is utilized for concurrently moving said hand and said pencil, the hand to indicate the speed on the dial and the pencil to record the speed on said recording-strip; substantially as set forth.

6. In an apparatus of the character described, the time mechanism, the recording-strip actuated thereby, the indicator having its hand, the pencil to mark upon said recording-strip, and means independent of said hand and intermediate the shaft of said hand and said pencil for imparting motion from said shaft to said pencil, combined with the drag to be drawn through the water astern of the vessel, and means intermediate said drag and said shaft, whereby the resistance offered to the drag is utilized for concurrently moving said hand and said pencil, the hand to indicate the speed on the dial, and the pencil to record the speed on said recording-strip; substantially as set forth.

7. The drag having the open front portion and the reduced rear portion, and the hinged front member secured to said drag, combined with the marking or recording mechanism, the strip on which the marking or recording is performed, and means intermediate said mechanism and said drag whereby the resistance to the latter is utilized to actuate said mechanism; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 6th day of March, A. D. 1899.

ALFRED G. DELANOY.

Witnesses:
CHAS. C. GILL,
E. JOS. BELKNAP.